



Oregon

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March 15, 2023

Bob Wyatt
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via electronic delivery (email)

**Re: DEQ Comments on the Revised In Situ Stabilization and Solidification Bench Scale
Treatability Study Work Plan
Former Gasco Manufactured Gas Plant Operable Unit (Gasco OU)
Portland, Oregon
ECSI# 84
ECSI# 183**

Dear Mr. Wyatt:

The Oregon Department of Environmental Quality (DEQ) reviewed the February 16, 2023 *In Situ Stabilization and Solidification Bench Scale Treatability Study Work Plan*¹ (Revised TSWP) submitted by Anchor QEA, LLC on behalf of NW Natural. The Revised TSWP was prepared under the *Administrative Settlement Agreement and Order on Consent for Removal Action*², U.S. Environmental Protection Agency Region 10 (EPA), CERCLA Docket No. 10-2009-0255 (ASAOC) and upland cleanup agreements^{3,4,5}. The Revised TSWP incorporates revisions intended to resolve January 18, 2023 comments from EPA⁶ and DEQ⁷ on the October 31, 2022 *In Situ Stabilization and Solidification Laboratory Pilot Study Work Plan*⁸ (LPS WP). After submitting the Revised TSWP, Anchor QEA, LLC, on behalf of NW Natural, submitted a *Revised In Situ Stabilization and Solidification Bench Scale Treatability Study Work Plan Addendum*⁹ (Revised TSWP Addendum) to DEQ on March 13, 2023. The Revised TSWP Addendum proposes modifying the scope of work presented in the Revised TSWP to remove Phase IV laboratory testing for upland soil.

Since the LPS WP included sampling and testing relevant to in-water work overseen by EPA under the ASAOC and upland work overseen by DEQ under the upland cleanup agreements, EPA and DEQ conducted a joint review of the October 31, 2022 LPS WP in a manner consistent with the Memorandum

¹ Anchor QEA, LLC. 2023. Revised In Situ Stabilization and Solidification Bench Scale Treatability Study Work Plan, Gasco Sediments Cleanup Action. Prepared on behalf of NW Natural. February 16.

² EPA. 2009. Administrative Settlement Agreement and Order on Consent for Removal Action, U.S. Environmental Protection Agency Region 10, CERCLA Docket No. 10-2009-0255. September 9

³ DEQ. 1994. Voluntary Agreement for Remedial Investigation/Feasibility Study. DEQ No. WMCVC-NWR-94-13. August 8.

⁴ DEQ. 2006. First Addendum to Voluntary Agreement for Remedial Investigation/Feasibility Study. DEQ No. WMCVC-NWR-94-13. July 19.

⁵ DEQ. 2016. Second Addendum to Voluntary Agreement for Remedial Investigation/Feasibility Study. DEQ No. WMCVC-NWR-94-13. October 11.

⁶ EPA 2023. EPA Comments on In Situ Stabilization and Solidification Laboratory Pilot Study Work Plan, Gasco Sediments Site. January 18.

⁷ DEQ. 2023. Letter to Bob Wyatt (NW Natural). Regarding: DEQ Comments on the In-Situ Stabilization and Solidification Laboratory Pilot Study Work Plan, Former Gasco Manufactured Gas Plant Operable Unit, Portland, Oregon, ECSI #84, ECSI #183. January 18.

⁸ Anchor QEA, LLC. 2022. In Situ Stabilization and Solidification Laboratory Pilot Study Work Plan, Gasco Sediments Cleanup Action. Prepared on behalf of NW Natural. October 31.

⁹ Anchor QEA, LLC. 2022. Revised In Situ Stabilization and Solidification Bench Scale Treatability Study Work Plan Addendum. March 13.

of Understanding for Portland Harbor Superfund Site (MOU)¹⁰. Consistent with the MOU, DEQ has transmitted review comments on the Revised TSWP and Revised TSWP Addendum scope of work relevant to the Gasco Sediments Site separately to EPA. Since EPA is the lead agency for the Gasco Sediments Site, we understand that our comments will be incorporated into EPA's comments provided to NW Natural.

The Revised TSWP indicates that, in order to address DEQ's implementability concerns related to using auger-based ISS construction technology, NW Natural is planning to use the DeWind One-Pass trenching technology to construct the ISS barrier wall, and that the upland soil sampling and testing approach proposed in the Revised TSWP has been modified to reflect the use of DeWind One-Pass trenching technology. The Revised TSWP is the first deliverable that proposes the DeWind One-Pass technology, and our understanding is that the forthcoming revised Source Control Addendum will provide a thorough evaluation of implementability and implementation risks associated with the technology. DEQ will reserve comments and questions related to implementability challenges associated with the DeWind One-Pass technology until we review the revised Source Control Addendum, but some initial items to consider include understanding the potential to mobilize dense non-aqueous phase liquid (DNAPL) to deeper depths (particularly in areas where the Lower Silt Unit is absent), the presence of obstacles along the ISS barrier wall alignment (e.g., building foundations, monitoring wells, dock access structures, utilities, cathodic protection systems, available width for equipment, subsurface obstructions and debris, maximum achievable depth).

The information provided in the Revised TSWP and Revised TSWP Addendum does not satisfactorily resolve DEQ comments on the LPS WP. In addition, the scope of work described in the Revised TSWP and Revised TSWP Addendum does not appear adequate to support the source control measure design or consider treatability data needs for upland soil located in the gap or zone between the ISS barrier wall alignment (assuming use of the DeWind One-Pass trenching technology) and the top of the riverbank. Overall, DEQ is concerned by the inadequate resolution of our comments on the LPS WP, the incomplete scope of treatability testing described in the Revised TSWP, and sudden changes in the scope of work described in planning documents (e.g., rapid change in ISS construction technology, Revised TSWP Addendum). Our impression is that NW Natural is trying to advance too quickly through the planning of the source control measure design. DEQ believes that advancing too quickly through the source control design without an adequate plan or a thorough assessment of data needs has the potential to result in schedule delays and/or uncertainty related to construction and long-term performance of the proposed source control measure, which, if approved, will ultimately become an element of the final Gasco OU remedial action. After DEQ's approval of a revised Source Control Addendum, we will require NW Natural to prepare a Source Control Design Work Plan. The Source Control Design Work Plan should include information typically included in a Remedial Design/Remedial Action Work Plan that would be specified in a Remedial Design/Remedial Action Scope of Work. We have attached boilerplate requirements for Remedial Design/Remedial Action Work Plan to this letter for your reference. Our comments provided herein further discuss information needed in the Source Control Design Work Plan. After DEQ's approval of the Source Control Addendum, we recommend that NW Natural set up a meeting with DEQ to refine the scope of the Source Control Design Work Plan. We note NW Natural

¹⁰ 2001. Memorandum of Understanding for Portland Harbor Superfund Site.

provided similar information in the *Final Pre-Design Basis of Design Technical Evaluations Work Plan*¹¹ (TEWP) that was prepared for EPA under the ASAOC.

DEQ does not approve the Revised TSWP or Revised TSWP Addendum. DEQ requires NW Natural to revise and resubmit the TSWP in a manner that satisfactorily addresses all of our comments before we will approve the document. If necessary, divide the TSWP into two deliverables that discuss upland and in-water work elements separately. Our general and specific comments are provided below.

General Comments

- 1) The Revised TSWP continues to state and/or imply that the upland ISS barrier wall is a component of the in-water remedy being designed under EPA oversight. By making these statements, NW Natural is suggesting that approval of the ISS barrier wall, the ISS barrier wall design, or work conducted to inform its design are EPA's decisions. In fact, the ISS barrier wall is only being considered as a source control measure¹² and ultimately as an element of the final Gasco OU (upland) remedial action. Therefore, selection of the ISS barrier wall as a source control measure and/or an element of the Gasco OU remedial action, and approval of the ISS barrier wall design, or work conducted to support its design, are DEQ's decisions. DEQ cannot approve any deliverable that states and/or implies that the ISS barrier wall is a component of the in-water remedy or suggests that approval of the ISS barrier wall or work conducted to inform its design are EPA's decisions. Based on our conversations with NW Natural's technical team, we believe that NW Natural's intent is to state that the in-water remedy and upland source control measure designs will be combined in future design deliverables. Revise the TSWP to clarify that the upland ISS is not an element of the in-water remedy, but that NW Natural intends to combine the in-water remedy and upland source control measure designs, subject to the appropriate regulatory authorities.
- 2) The Revised TSWP states "The upland ISS barrier wall will only be designed if ISS technology is used to address all riverbank, shallow, and intermediate region sediment contamination. It would not be designed as a component of any other sediment remedy configuration." There does not appear to be a technical basis for this statement. For clarification, DEQ does not require NW Natural to construct the ISS barrier wall as a source control measure. In fact, as stated in our December 23, 2022 comment letter¹³ on the *Source Control Addendum*¹⁴, DEQ's preference is for NW Natural to evaluate the new source control alternative¹⁵ as part of the Gasco OU Feasibility Study (FS). Our review and consideration of the ISS barrier wall as a source control measure in advance of the Gasco OU FS is at NW Natural's request. It is important to clarify that DEQ previously approved a vertical barrier wall along the shoreline adjacent to the former tar ponds as an element of a source control measure for

¹¹ Anchor QEA, LLC. 2019. Final Pre-Remedial Design Basis of Design Technical Evaluations Work Plan. Gasco Sediments Cleanup Action. Prepared on behalf of NW Natural. August 29.

¹² In NW Natural's response to DEQ General Comment #3 on the LPS WP, NW Natural's indicates that the rationale for including the ISS barrier wall as a component of the in-water remedy is that it "is designed to minimize groundwater discharge to ISS-treated riverbank soils and in-water sediments." This function is, by definition, upland source control.

¹³ DEQ. 2022. Letter to Bob Wyatt (NW Natural). Regarding: DEQ Comments on the Source Control Addendum Report, Former Gasco Manufactured Gas Plant Operable Unit, Portland, Oregon, ECSI #84, ECSI #183. December 23.

¹⁴ Anchor QEA, LLC. 2022. Source Control Addendum Report, NW Natural Gasco Site, ECSI No. 84. Prepared for NW Natural. November 10.

¹⁵ The 'new source control alternative' referenced in our Source Control Addendum comments consists of: 1) a deep ISS barrier wall along the entire Gasco OU shoreline and adjoining property boundary with U.S. Moorings; 2) a groundwater interceptor trench(s) extending through the Fill water-bearing zone (WBZ), upper silt unit, and portions of the Upper Alluvium WBZ; 3) a network of monitoring wells.

DNAPL in 2008¹⁶. The vertical barrier wall approved by DEQ in 2008 was significantly different in purpose, scale, and scope compared to the ISS barrier wall that is currently proposed by NW Natural as a source control measure. During the design of the HC&C system, DEQ and NW Natural agreed to postpone constructing a vertical barrier wall as part of a source control measure, and to further evaluate the vertical barrier in the Gasco OU FS. Consistent with our previous agreements, we require NW Natural to include a vertical barrier wall(s) as an element of at least one remedial alternative presented in the Gasco OU FS, regardless of whether NW Natural proceeds with the ISS barrier wall as a source control measure in parallel with the in-water remedial design. DEQ will select the Gasco OU remedial action based on results of the Gasco OU FS.

- 3) DEQ has reviewed the Revised TSWP in advance of approving a revised Source Control Addendum to accommodate an efficient design schedule with the understanding that the proposed scope of treatability testing takes a long time to complete and is necessary for informing the source control design. However, selecting an appropriate grout mix design is not the only data gap associated with the proposed new source control alternative design. Following DEQ approval of the revised Source Control Addendum, NW Natural should prepare a Source Control Design Work Plan that includes, but is not necessarily limited to: 1) a list and description of planned design evaluations for all of the new source control alternative elements and explanations of how these evaluations inform the design (e.g., how leachability results will be used to estimate diffusive flux); 2) identification of data needs to support the planned design evaluations; 3) identification of remaining data gaps; 4) a description of the necessary work to fill remaining data gaps; and 5) a description of and schedule for each design task and activity. Consistent with Specific Comment #12 on the LPS WP, DEQ requires that all data gaps, including the results of treatability testing and a recommended final grout mix design, be addressed no later than the Interim Design (representing the 50% Design).
- 4) NW Natural's revisions to Section 4 and response to DEQ Specific Comment #12 (and EPA General Comment #9) indicate a plan to resubmit a "Revised Basis of Design Report and Preliminary Design," representing a 50% design level, as soon as possible, followed by an Interim Design, and a Final Design. DEQ does not accept NW Natural's description of planned design milestones for the ISS barrier wall and groundwater interceptor trench(es). DEQ has the following comments:
 - a) DEQ approval of the revised and resubmitted Source Control Addendum is required before NW Natural can advance to the next design deliverable for the new source control alternative.
 - b) After approval of the revised Source Control Addendum, design of the ISS barrier wall and groundwater interceptor trench(s) should progress through the following design milestones: 1) Source Control Design Work Plan (refer to General Comment #3); 2) Basis of Design Report, 3) Interim Design representing the 50% design milestone, 4) a Pre-Final Design representing the 90% or 95% design milestone, and 5) a Final Design representing the 100% design milestone. DEQ will also require a Construction Quality Assurance/Quality Control Plan prior to source control measure construction. All design data gaps must be addressed before the Interim Design milestone (refer to General Comment #3). If these design milestones differ from EPA's required design milestones for the Gasco Sediments Site remedial design, NW Natural may separate the

¹⁶ DEQ. 2008. Letter to Robert J. Wyatt (NW Natural). Regarding: Groundwater/DNAPL Focused Feasibility Study Shoreline Segments 1 and 2, NW Natural Property and Northern Portion of Siltronic Corporation Property, NW Natural Gas Company, Portland, Oregon, ECSI No. 183. March 21.

in-water remedy design and upland source control measure design deliverables. DEQ recommends a meeting between NW Natural, EPA, and DEQ to discuss the scope and schedule of design milestones to ensure that EPA's and DEQ's needs can be met with a combined in-water remedy and upland source control design approach.

- 5) DEQ understands that the DeWind One-Pass trenching equipment referenced in the Revised TSWP is approximately 22 feet wide and will create an ISS barrier wall approximately 3 feet thick. While the exact dimensions of the equipment have not yet been provided to DEQ¹⁷, if it is assumed that the 3-foot-thick ISS barrier wall is created from the center of the 22-foot-wide equipment, then the ISS barrier wall and top of the riverbank will be separated by approximately 9.5 feet (assuming the edge of the equipment operates at the exact top of riverbank). While not stated in the Revised TSWP, DEQ assumes NW Natural intends to apply ISS treatment to the upland soil between the ISS barrier wall and the top of riverbank in order to physically connect the ISS barrier wall with in-water remedy. If so, then NW Natural will need to develop a basis for the ISS treatment depth of these upland soils for DEQ approval. DEQ does not consider the homogenized upland soil samples or sediment samples currently proposed in the Revised TSWP to be representative of the upland ISS treatment prism between the ISS barrier wall and top of riverbank. Revise the TSWP to include: 1) an assumed depth of ISS treatment in the zone between the ISS barrier wall and top of riverbank (including the basis for determining the assumed depth), 2) an assumed ISS construction approach for upland soils within the zone between the ISS barrier wall and top of riverbank, 3) sampling of upland soils representative of the ISS treatment prism within the zone between the ISS barrier wall and top of riverbank, and 4) treatability testing of these soils to determine an appropriate grout mix design(s). The revised Source Control Addendum should expand discussion of these assumptions in more detail in its discussion of compatibility of the proposed new source control alternative with future remediation of the Gasco OU uplands (refer to General Comment #4b on the Source Control Addendum).
- 6) The Revised TSWP proposes a soil sampling approach based on the anticipated use of the DeWind One-Pass trenching technology to construct the ISS barrier wall. The treatability study approach described in the Revised TSWP is only applicable to an ISS barrier wall constructed with the DeWind One-Pass technology. If it is determined in the revised Source Control Addendum or subsequent source control design that the DeWind One-Pass technology is unable to overcome implementability challenges across all or a portion of the ISS barrier wall alignment, additional treatability testing will be necessary to support ISS designs that rely on alternative construction technologies.
- 7) The Revised TSWP Addendum proposes removing Phase IV leachability testing from the scope of treatability testing for upland soils. DEQ requires Phase IV leachability testing. We will consider modifications to the scope of Phase IV leachability testing based on results of the Phase III testing. Treatability testing for upland soils is being conducted under upland cleanup agreements, not CERCLA (refer to general comment #1), so the EPA Guidance for Conducting Treatability Studies at Fund-lead sites under CERCLA¹⁸ does not apply.
- 8) Since the new source control alternative has the potential to ultimately become an element of the final Gasco OU remedial action, DEQ requires that initial characterization and Phase IV leachate testing

¹⁷ DEQ requested shop drawings of the proposed DeWind One-Pass trenching equipment from DeWind on February 17, 2023, but has not yet received a response.

¹⁸ EPA. 1992. Guidance for Conducting Treatability Studies Under CERCLA. October.

include analysis for the full suite of Gasco COCs with a complete pathway to the Willamette River. The list of Gasco COCs that have a complete pathway to the Willamette River is more expansive than the list of Portland Harbor ROD Table 17 COCs with groundwater cleanup levels. NW Natural and DEQ are in the process of assigning preliminary remediation goals (PRGs) to Gasco COCs. DEQ will not approve testing of a subset of Gasco COCs before resolving discussions related to PRGs assignments for the Gasco OU FS.

- 9) Appendix E of the Revised TSWP presents NW Natural's responses to EPA and DEQ comments on the LPS WP. NW Natural's responses to EPA comments provide information about work DEQ is overseeing, making it difficult for DEQ to determine how our comments have been addressed and adding to confusion about the scopes of work that are subject to DEQ oversight (refer to general comment #1). All future deliverables that are submitted for joint EPA and DEQ review should include separate responses to EPA and DEQ comments in stand-alone appendices. Responses to DEQ's comments must be complete and should not reference additional information in responses to EPA's comments.
- 10) In their response to EPA's To Be Considered Comment #3, NW Natural provides project examples where the DeWind One-Pass technology has been used to construct barrier walls to depths of more than 100 feet below ground surface (bgs) and concludes by stating that experience gained with the cited project examples should not require a field pilot scale project to demonstrate the feasibility of constructing the ISS barrier wall to the proposed depths. DEQ has the following comments:
 - a) It is unclear why NW Natural's response to an EPA comment contains this information. Neither EPA nor DEQ commented about the need to conduct an upland field pilot scale project in our respective reviews of the LPS WP. Revise the TSWP, including responses to EPA and DEQ comments, to remove discussion related to the need for an upland field pilot study.
 - b) DEQ General Comments #7a and #8 on the Source Control Addendum identified the need to conduct a field pilot study to demonstrate the ability to construct an ISS barrier wall to the dimensions and depths proposed by NW Natural. It is inappropriate for NW Natural's response to an EPA comment on the LPS WP to attempt to resolve DEQ comments on the Source Control Addendum. The revised Source Control Addendum (not the TSWP) should provide the information necessary to resolve our comments on that document. DEQ observes that only one project cited by NW Natural achieved depths of 145 feet bgs, and NW Natural indicates that excavation of 10 feet or more would be required in some areas in order to achieve the proposed ISS barrier wall depths at the Gasco OU. DEQ considers the ISS barrier wall depths proposed by NW Natural to approach or exceed the limit of available technology.
 - c) On March 8, 2023, Siltronic Corporation (Siltronic) provided comments¹⁹ on the Revised TSWP. In their comments, Siltronic expressed an opinion that a field pilot scale project is necessary to demonstrate the feasibility of constructing the ISS barrier wall using the DeWind technology on the portion of their property where the barrier wall is proposed.

¹⁹ Maul, Foster, and Alongi. 2023. Letter to Hunter Young (EPA) and Wesley Thomas (DEQ). Regarding: Siltronic Comments to NW Natural Revised In Situ Stabilization and Solidification Bench Scale Treatability Study Work Plan. March 8.

- 11) Certain responses to DEQ comments on the LPS are insufficient and require further resolution, most notably the following:
- a) General Comment #2. Revisions to address General Comment #2 are inadequate. Refer to DEQ's Specific Comments on the Revised TSWP provided below.
 - b) General Comment #3. NW Natural's response to General Comment #3 is not acceptable. Refer to General Comment #1 on the Revised TSWP provided above.
 - c) General Comment #4. DEQ acknowledges the need to use deionized water to conduct the Phase IV leaching tests. Water used for leaching tests should be purged with nitrogen gas to ensure it is deoxygenated prior to testing.
 - d) General Comment #5e. NW Natural's statement that it is infeasible to vary the grout mixture to meet localized differences in soil characteristics is incorrect. DEQ has recent experience implementing ISS at a cleanup site in Portland where the grout mix design was varied based on moisture content and other soil characteristics.
 - e) General Comment #8. In their response to EPA General Comment #7, NW Natural relies on testing results at two sediment sites to justify excluding addition of sportive amendments to the scope of the treatability study. The two sites referenced in EPA General Comment #7 are not comparable to an upland setting or ISS application. DEQ acknowledges that for sediment, adding amendments to a cap over ISS treated sediments may be more effective or efficient than adding amendments into the ISS grout. However, incorporation of amendments into upland ISS grout designs is common. DEQ requires additional justification for excluding amendments from consideration of grout mix designs for the ISS barrier wall.
 - f) Specific Comment #9. Grout curing is an exothermic reaction that may result in significant volatile organic compound (VOC) off-gassing. Monitoring of VOC off-gassing from grout-treated soils is simple to accomplish. One test cylinder of grout-treated soil can be placed inside a plastic bag and headspace air samples can be collected from a tube inserted into a small opening in the bag. Gas measurements can be collected using hand-held instruments (e.g., Draeger tubes, PID, etc.). Frequency on similar scopes of work typically collect measurements for these cylinders directly after preparation of the canister, after 24 hours, and again after 72 hours of curing time. DEQ will require an evaluation of the off-gassing to consider for potential risks to receptors that may occur and require additional consideration for off-gas management.

Specific Comments

- 1) **Cover Page**. Include "Gasco OU" and "ECSI Nos. 84 and 183" on the cover page below "Gasco Sediments Cleanup Action."
- 2) **Section 1, Introduction and Objectives**. Revise the first sentence to add "and the Gasco OU" after "at the Gasco Sediments Site."
- 3) **Section 1, Introduction and Objectives**. Revise the text and add figures (as necessary) to identify the location of the Gasco OU.
- 4) **Section 1, Introduction and Objectives**. The first sentence of the second paragraph states, "Because the ISS technology will be designed to both prevent groundwater flux to ISS-treated sediments and

riverbank soils and as a source control measure..., NW Natural is submitting this revised Work Plan to both EPA and DEQ.” DEQ clarifies that preventing upland groundwater flux to ISS-treated sediments and riverbank soils is, by definition, upland source control. Revise the first sentence to clarify that because NW Natural is proposing to construct an upland source control measure that includes an upland ISS barrier wall that will physically integrate with the in-water remedy, which terminates at the top of the riverbank, NW Natural is submitting this revised Work Plan to both EPA and DEQ. Refer to General Comment #1.

- 5) **Section 1, Introduction and Objectives.** The last paragraph states that the preferred design identified in the *Preferred Alternative Report*²⁰ (PAR) “includes an ISS treatment barrier wall that will only be included if EPA approves the ISS technology in the design for the nearshore area.” DEQ clarifies that the ISS barrier wall is not a component of the in-water remedy. Refer to General Comment #1. Further, DEQ expects a vertical barrier wall to be evaluated in the Gasco OU FS, consistent with previous agreements between NW Natural and DEQ, and regardless of the technology used to construct a protective remedy in the nearshore area. Refer to General Comment #2.
- 6) **Section 1.1, Background.** The placement of Footnote 3 after “an integrated deep ISS treatment barrier wall in the Gasco OU at the top of riverbank” suggests that the ISS barrier wall is included as an element of the Portland Harbor Superfund Site Record of Decision (ROD) selected remedy. Revise the footnote to clarify that the ROD did not select groundwater barrier walls as an element of the Portland Harbor Superfund Site remedy, and that the footnote applies only to the navigation channel, intermediate, shallow, and riverbank (riverward of the top of riverbank) regions of the Portland Harbor Superfund Site. Refer to General Comment #1.
- 7) **Section 1.1, Background.** The last paragraph states that the ISS barrier wall, groundwater interceptor trench, and network of monitoring wells are all necessary components of the ISS sediment remedy. DEQ clarifies that the neither the ISS barrier wall, groundwater interceptor trench, nor the network of monitoring wells are components of the in-water remedy. Refer to General Comment #1.
- 8) **Section 1.1, Background.** The last paragraph states that the ISS barrier wall along the shared U.S. Moorings and Gasco property boundary promotes structural stability of the sediment remedy along the riverbank. It is unclear to DEQ how a barrier wall along the US Moorings and Gasco property boundary would contribute to sediment stability. DEQ recommends that NW Natural clarify that the barrier wall along the US Moorings and Gasco property boundary is proposed solely as a source control measure.
- 9) **Section 2, Existing Data Review and Sample Location Selection.** The first paragraph indicates that five locations along the top of the riverbank were selected to cover a range of representative conditions. The proposed locations appear to be set back several feet from the top of riverbank, based on the information provided on Figure 2-7. Revise the text to clarify that the sample locations selected to cover a range of representative conditions are set back into the uplands from the top of riverbank. These setback locations are likely more representative of soils along the ISS barrier wall alignment. Refer to General Comment #5.

²⁰ Anchor QEA, LLC. 2022. Preferred Alternative Report, Gasco Sediments Cleanup Action. Prepared on behalf of NW Natural. October 31.

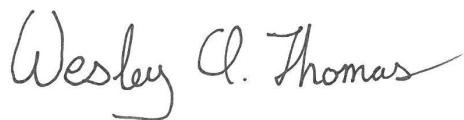
- 10) **Section 2.2, Soil Sample Locations.** The first sentence states that the sediment remedy design includes an ISS barrier wall. DEQ clarifies that the ISS barrier wall is not a component of the in-water remedy. Refer to General Comment #1.
- 11) **Section 2.2, Soil Sample Locations.** The second sentence states that the ISS barrier wall element provides groundwater and potential DNAPL source control required for the ISS sediment design to be protective. DEQ clarifies that upland source control is required for any sediment remedy to remain protective, whether the remedy includes of ISS, dredging and capping, or a combination thereof. In addition, several alternative source control approaches, including the existing source control approach²¹, as described in our comments on the Source Control Alternative, achieve DEQ's source control objectives and are expected to ensure that the in-water remedy remains protective.
- 12) **Section 3.1, Sample Collection and Handling.** DEQ recommends that some of the homogenized soil sample volumes be frozen/archived for testing in the event of laboratory errors, grout mixing errors, unexpected cylinder cracking, or other incident, to avoid re-sampling.
- 13) **Section 3.3, Summary of Phased Treatment Testing Approach.** The second to last sentence indicates that workability of the grout will be used as a consideration for identifying grout mix designs to carry into leachability testing. Please clarify how workability will be assessed. Will workability be assessed with slump measurements?
- 14) **Section 3.5, Phase II – Grout Dosage Testing.** Footnote 11 indicates that if dosage rates higher than the proposed 10% rate are identified for upland soil during the Phase II testing, NW Natural will coordinate with EPA and DEQ to incorporate a higher dosage rate in the testing. Revise Footnote 11 to clarify that coordination regarding adjustments to upland soil treatability testing will only include DEQ. Refer to General Comment #1.
- 15) **Section 3.5, Phase II – Grout Dosage Testing.** Visual assessment of cylinders should also include visual assessment of free liquids and/or observed sheens, in addition to DNAPL.
- 16) **Section 3.5, Phase II – Grout Dosage Testing.** Grout dosage testing should also consider the physical condition of cylinders. Cracking or other evidence of physical degradation not captured by the physical tests should indicate the performance criteria is not met.
- 17) **Section 3.6.2, Phase IV Leachability and Advanced Physical Testing.** The last sentence of the first paragraph states that leachability will be evaluated in terms of the COC mass released by combining aqueous phase concentrations with the mass of COCs extracted from the PDMS liner insert. This approach will likely underestimate mass of contaminants released from the cylinder if VOC off-gassing is not accounted for.
- 18) **Appendix A (Revised In Situ Stabilization and Solidification Bench Scale Treatability Study Field Sampling Plan), Cover Page.** Include “Gasco OU” and “ECSI Nos. 84 and 183” on the cover page below “Gasco Sediments Cleanup Action.”

²¹ The ‘existing source control approach’ referenced in our Source Control Addendum comments includes a Fill WBZ source control measure consisting of groundwater interceptor trenches and/or horizontal wells (i.e., not just horizontal wells), the current HC&C system, and a final upland remedy (selected in a ROD based on the Gasco OU FS) for DNAPL.

- 19) **Appendix A (Revised In Situ Stabilization and Solidification Bench Scale Treatability Study Field Sampling Plan), Section 1, Introduction.** Revise this section to clarify that the top of riverbank within the Gasco Operable Unit is not included in the Gasco Sediments Site Project Area. In addition, revise Figure A-1 to identify the location of the Gasco OU.
- 20) **Appendix A (Revised In Situ Stabilization and Solidification Bench Scale Treatability Study Field Sampling Plan), Section 3.3.1, Subsurface Soil Sampling Plan.** The second paragraph indicates that soil borings will be advanced at five locations on the top of the riverbank. The proposed locations appear to be set back several feet from the top of riverbank, based on the information provided on Figure A-3. Revise the text to clarify that the soil boring locations are set back into the uplands from the top of riverbank. These setback locations are likely more representative of soils along the ISS barrier wall alignment. Refer to General Comment #5.
- 21) **Appendix B (Revised In Situ Stabilization and Solidification Bench Scale Treatability Study Quality Assurance Project Plan), Cover Page.** Include “Gasco OU” and “ECSI Nos. 84 and 183” on the cover page below “Gasco Sediments Cleanup Action.”
- 22) **Appendix B (Revised In Situ Stabilization and Solidification Bench Scale Treatability Study Quality Assurance Project Plan), Section 1, Introduction.** Revise this section to clarify that the top of riverbank within the Gasco Operable Unit is not included in the Gasco Sediments Site Project Area.
- 23) **Appendix B (Revised In Situ Stabilization and Solidification Bench Scale Treatability Study Quality Assurance Project Plan), Figure B-1.** For clarification, DEQ is the lead agency overseeing treatability testing to inform the ISS barrier wall design and will oversee the upland elements of the work directly. Refer to General Comment #1.
- 24) **Revised TSWP Addendum.** The Revised TSWP Addendum proposes preparing representative composite samples by collecting material equally from across the full length of soil borings, which is a slight modification from the approach presented in the Field Sampling Plan (Appendix A of the Revised TSWP). Revise the TSWP to describe how the newly proposed methodology will be accomplished, and what quality control measures will ensure that equal sample aliquots are collected along the entire soil sample core. In addition, clarify that soil representative of material that will be excavated before constructing the ISS barrier wall (top 10 feet of soil in areas where excavation is necessary for the DeWind One-Pass technology to achieve 155 feet bgs) will be excluded from TSWP samples.

Please do not hesitate to contact me at (503) 229-6932 or Wesley.Thomas@deq.oregon.gov if you have any questions regarding this letter.

Sincerely,



Wesley A. Thomas
Project Manager
NWR Cleanup Section

Attachment 1: Boilerplate Requirements for Remedial Design/Remedial Action Work Plan

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CC: ECSI No. 84 File
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ATTACHMENT B
REMEDIAL DESIGN/REMEDIAL ACTION
SCOPE OF WORK BOILERPLATE

RD/RA WORK PLAN

The RD/RA Work Plan shall be developed in conformance with DEQ's ROD dated [INSERT DATE]; this Scope of Work; and as appropriate, EPA's "Superfund Remedial Design Remedial Action Guidance," OSWER Directive 9355.0-4A, 1986; "Guidance on Expediting Remedial Design and Remedial Action," OSWER Directive 9355.5-02; and any additional guidance documents as directed by DEQ.

The RD/RA Work Plan shall be prepared for all activities to be conducted during remedial design and remedial action and shall include, at a minimum, the following items:

1. Description of proposed RD/RA tasks and activities to be performed.
2. Proposed schedule for submittal of RD/RA deliverables and implementation of all proposed RD/RA activities.
3. Identification and description of duties, responsibilities, authorities, and qualifications of the personnel involved in the remedial design and remedial action.
4. Project organization and identification of reporting relationships, lines of communication, and authorities.
5. Summary of the selected remedy and cleanup levels.
6. General description of remedial actions to be performed.
7. Identification and description of design objectives.
8. Identification and description of design criteria and performance standards that shall be applied to the remedial activities to be conducted by Respondent.
9. Identification and listing of federal, state, or local laws, regulations, or guidance applicable to or associated with the remedial action and an explanation of how they will be incorporated into the design and implementation of the remedial action.
10. Assessment of permitting requirements, including identification of any permitting or procedural requirements exempted pursuant to ORS 465.315(3) (as stated in the ROD or Consent Order, or as proposed to be exempted), and a plan for satisfying any applicable substantive or non-exempted permitting/procedural requirements. A description of permitting requirements shall be included in the specific design reports.
11. Identification of any off-site disposal facilities and requirements for disposal, if any.
12. Identification and description of any site access agreements required to implement RA activities.

13. Description of any proposed bench scale or pilot scale studies, treatability studies, or unit process evaluations. Include study objectives and a schedule for submittal of a more detailed work plan describing design parameters, data requirements, size and scale, mobilization procedures, and schedule for conducting the tests.
14. Identification and description of additional sampling, evaluations, or engineering studies required to supplement available technical information.
15. Identification and description of any property, utility, right-of-way, topographic, or other site surveys required.
16. Description of any special design/implementation problems anticipated and how they will be addressed. Include any special technical problems, anticipated community relations problems, access, easements, rights-of-way, transportation, utilities, and logistics problems.
17. Identification and description of institutional controls to be imposed during and/or after remedial action activities.
18. Description of construction methods and equipment to be used.
19. Procedures for documentation/validation of remedial action activities.